CLAIMS:

1. A magnetic resonance imaging device, comprising at least:

a) a main magnet system (2) for generating a steady magnetic field in a measuring space of the magnetic resonance imaging device;

b) a gradient system (3) comprising gradient coils for generating a magnetic gradient field in said measuring space; and

c) at least one active shielding device (13, 14; 19, 20) assigned to the main magnet system (2);

characterized in that the or each active shielding device is driven by an electrical current in order to reduce magnetic field penetration inside the main magnet system (2) and to reduce mechanical forces induced in the main magnet system (2).

2. A magnetic resonance imaging device according to claim 1, characterized in that the gradient coils are driven by a gradient coil current, the electrical current used to drive the or each active shielding device (13, 14; 19, 20) and the gradient coil current having the same frequency spectrum.

3. A magnetic resonance imaging device according to claim 2, characterized in that the electrical current used to drive the or each active shielding device and the gradient coil current are characterized by a different magnitude and a phase shift, said magnitude and said phase shift being determined to reduce magnetic field penetration inside the main magnet system and to reduce mechanical forces induced in the main magnet system (2).

4. A magnetic resonance imaging device according to claim 1, characterized in that the or each active shielding device comprises at least one electrical coil (16; 21).

5. A magnetic resonance imaging device according to claim 4, characterized in that the or each electrical coil (16; 21) is fixedly or flexibly attached to the main magnet system (2), wherein an electrical insulator (18) is sandwiched between the or each electrical coil (16, 21) and the main magnet system (2).

6. A magnetic resonance imaging device according to claim 5, characterized in that the or each electrical coil (16, 21) is fixedly or flexibly attached to lateral flanges (15) of the main magnet system (2).

7. A magnetic resonance imaging device according to claim 6, characterized in that the or each electrical coil (16; 21) is in addition fixedly or flexibly attached to the main magnet system (2) in the region of the bore hole (26).

8. A magnetic resonance imaging device according to claim 5, characterized in that the or each electrical coil (16, 21) is fixedly or flexibly attached to the bore hole (26) of the main magnet system (2).

9. A magnetic resonance imaging device according to claim 1, characterized in that at each lateral flange (15) of the main magnet system (2) there is positioned at least one active shielding device (13, 14; 19, 20) comprising at least one electrical coil (16; 21).

10. A magnetic resonance imaging device according to claim 9, each active shielding device (19, 20) comprises a set of coils (21) connected in series building a spiral coil, wherein all coils (21) of said spiral coil are driven by the same electrical current.

11. A magnetic resonance imaging device according to claim 9, characterized in that each active shielding device (13, 14) comprises a set of concentric coils (16), wherein each of said concentric coils (16) is separately driven by an individual electrical current.

12. A magnetic resonance imaging device according to claim 1, characterized in that the or each active shielding device (13, 14; 19, 20) is driven by an electrical current generated by an electrical circuit connected in series or in parallel with the gradient system (3).

13. A magnetic resonance imaging device according to claim 12, characterized in that the electrical circuit is designed as a linear electrical circuit.

14. A magnetic resonance imaging device according to claim 12, characterized in that the electrical circuit comprises an error corrector unit, wherein the error corrector unit adopts the electrical current used to drive the or each active shielding device (13, 14; 19, 20) in order to minimize vibrations of the main magnet system (2).

15. A magnetic resonance imaging device according to claim 14, characterized in that the error corrector unit is designed as a feed forward filter (25).

16. A magnetic resonance imaging device according to claim 15, characterized in that the feed forward filter (25) is designed on basis of vibration measurements of the main magnet system (2), wherein these vibration measurements are performed off-line.

17. A magnetic resonance imaging device according to claim 14 or 15, characterized in that the error corrector unit adopts the electrical current used to drive the or each active shielding device (13, 14; 19, 20) in a way that the amplitude and/or phase shift compared to the current used to drive the gradient coils is modified.